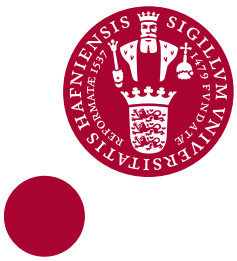

Breaking boundaries: How gestures reveal conceptualization of boundary-crossing in Italian

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Breaking boundaries:

How gestures reveal conceptualization of boundary-crossing in Italian

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Abstract

It has long been considered a linguistic constraint for speakers of verb-framed languages to express boundary-crossing events with manner verb + path satellite constructions. Recent theoretical discussions suggest that Italian may overcome this constraint by expressing directed motion by means of manner verbs + complex locative PPs that can be interpreted as boundary-crossing. We ask whether these constructions are produced in natural speech and how co-speech gestures may help disentangle the ambiguous nature of such expressions. Results show that a small number of boundary-crossing events are expressed with manner verbs + complex PPs. Co-expressive gestures support the claim that these constructions are conceptualized as being boundary-crossing.

Index Terms: Motion events, gesture, boundary-crossing, conceptualization, linguistic encoding, Italian

1. Introduction

We typically gesture when we talk about everyday events like motion. These co-speech gestures are often semantically and temporally tightly related to speech and language [1, 2]. When describing how a man walks down a street, co-occurring gestures tend to reflect the same aspects of the event. Several studies have documented how speakers from different languages gesture differently when describing the same events because of differences in the morpho-syntactic and lexico-grammatic properties of their particular language (for an overview see [3]). Languages differ in how meaning is expressed and how this meaning is mapped onto linguistic form. A widely used typological distinction proposed by Talmy [4, 5] divides languages into – at least – two major groups (e.g., *verb-* and *satellite-framed languages*) with respect to how these language types linguistically express MANNER and PATH of motion. Numerous studies across a variety of different languages confirm this typological division showing striking differences in form-meaning mappings when speaking about motion (for a recent overview see [6-8]).

However, other studies suggest that a strict division of language types is not that clear-cut. Most languages straddle more than one of the Talmyan categories [9], and speakers can use a variety of different constructions that fall within both verb- and satellite-framing lexicalization patterns [10]. In fact, modern spoken Italian, which is considered a verb-framed language, shows emerging signs of satellite-framing constructional patterns, e.g., an optional use of manner verbs + directional satellites to express a figure's movement along a path. But one limitation of satellite-framed event construal in Italian, and in verb-framed languages in general, is the *Boundary-crossing constraint* [11, 12]. According to this linguistic constraint, speakers of verb-framed languages cannot construct boundary-crossing expressions using manner verbs and path satellites within a clause, the defining property of satellite-framed languages. Speakers of verb-framed languages must resort to other syntactical measures to express the manner and path components. However, recent theoretical discussions suggest that Italian may overcome this linguistic constraint to express manner verb + locative PP constructions within a clause that can be *interpreted* as a figure's movement across a spatial boundary. However, as these constructions are locative in nature, we look at co-speech gestures as a reflection of linguistic conceptualization to shed light on whether such constructions are in fact conceptualized as being directional and boundary-crossing.

2. Background

Italian is traditionally categorized as a verb-framed language where path of motion is expressed in the verb root and manner of motion, if expressed at all, is subordinated in PPs or adverbial expressions e.g., a gerund like in (1). The main verb *entrò* - 'entered' and the subordinate manner verb *galleggiando* - 'floating' are divided into two separate clauses.

(1) La bottiglia entrò nella grotta galleggiando
'The bottle entered in.the cave floating'

By contrast, satellite-framed languages need only one clause to express the same information. In these languages manner is encoded in the main verb and path in a satellite to the verb with a verb particle or a PP as in (2).

(2) The bottle floated into the cave

However, typologies are not rigidly fixed, and Italian can express motion in satellite-framed ways with manner verbs and directional verb particles [13] as seen in (3) where the directional component (PATH) is expressed in the verb particle *giù* - 'down'.

(3) Il pomodoro rotola giù per la collina
'The tomato rolls down to the hill'

The 'split system' possibility of verb particle constructions is seen as a developing lexicalization pattern in modern spoken Italian [14], but the crucial difference between verb- and satellite-framed construction possibilities lies in the notion of the boundary-crossing constraint [15]. Crossing a spatial boundary is conceived as "*a change of state, and that state changes require an independent predicate in such languages*" [16 pp:441]. Therefore, speakers of verb-framed languages are required to express path in the main verb and subordinate manner in verbs ('descends *rolling*') or in subordinate manner expressions ('descends *in rotation*'). Both these alternatives impose more complex processing demands, resulting in a tendency for speakers to leave out manner of motion [17].

The main problem is the Italian prepositional system, which is inherently locative. Italian prepositions do not encode the directionality needed to express the path of motion in boundary-crossing situations when manner is mapped onto the main verb as in (4).

(4) *La bottiglia galleggiò dentro la grotta
'The bottle floated inside the cave'

Dentro -'in'/'inside' only encodes locative state, so the bottle does not change direction from outside the cave across the spatial boundary into the cave. Motion is self-contained and it moves at a stationary point (inside the cave). Lacking the possibility of encoding goal of motion in prepositions, Italian speakers are inhibited from using satellite-framed patterns in boundary-crossing situations and therefore obey Talmyan generalization [18]. Özçalışkan [19 pp:18] go even further suggesting that "*the boundary-crossing constraint has the potential to serve as a litmus test that can be applied to languages to show that they are verb-framed*".
Current theoretical discussions challenge the absolute categorization of motion constructions for Italian within boundary-crossing expressions.

2.1. Boundary-crossing interpretation

Recently, it has been suggested that motion events can be constructed using manner verbs + complex locative PPs, which can be interpreted as directional and boundary-crossing [20-22]. According to Folli [20], Italian allows for goal of motion constructions with manner verbs in two ways depending on the lexical properties of the verb itself. Some Italian manner verbs (e.g., *correre* – 'to run') allow for directional meaning combined with locative PPs or complex PPs. The verb identifies the notion of movement from one point to another and the complex PP the PATH and the PLACE (*dentro a* – 'inside to') as in (5).

(5) Gianni è *corso* **dentro a**l parco
Gianni is run inside to.the park
'Gianni ran into the park'

Supporting Folli's claim that Italian may allow for constructions that can be read as boundary-crossing, Cardini [22], in a judgment task, asked participants to judge whether expressions containing different manner verb + preposition combinations expressed directional or locative meaning as in (6) and (7).

(6) Il gatto corse dentro la stanza
'The cat ran into/inside the room'

(7) Il gatto corse fuori dalla stanza
'The cat ran out/outside of the room'

Surprisingly, a majority of the participants interpreted the expressions to be boundary-crossing despite the locative PPs contain no clear directional markers. The results only strengthen the claim that the semantic properties of certain Italian manner verbs combined with locative PPs may give rise to not only directional meaning but also boundary-crossing meaning.
In sum, these studies argue that Italian can overcome the boundary-crossing constraint by expressing motion across a spatial boundary by means of manner verbs and locative PPs pragmatically functioning as directional satellites. But as long no directional features are expressed in the locative PPs, we cannot be entirely certain whether these motion constructions are meant to be directional or merely locative.
A more in-depth investigation of such ambiguous expressions is needed to determine whether speakers conceptualize the events as the traversal of a spatial boundary or not, and if the boundary-crossing constraint truly can serve as a litmus test to test whether languages are in fact verb-framed.

2.2. Linguistic conceptualization

According to Slobin [23], cross-linguistic variation in lexicalization patterns lead speakers of different languages to attend to different aspects of experience when constructing events, i.e. what meanings are selected for expressions and how they are linguistically packaged. This process - also known as *thinking-for-speaking*, targets the possible effects of language on thinking that occurs online in the process of speaking (linguistic conceptualization). Lexicalization patterns are often taken as evidence of linguistic conceptualization, but speech analysis alone cannot account for meaning selection in ambiguous expressions as seen in (5) and determine, without pragmatic clues or inference, what meaning is intended to be conveyed [24]. To resolve this problem, we turn to co-speech gestures as a possible window to linguistic conceptualization.

2.3. Why gestures?

Speech, gesture and language are increasingly seen as planned and processed together in production, and co-speech gestures are often semantically and temporally tightly coordinated with speech, expressing closely related meaning. Several cross-linguistic studies have shown that speakers of typologically different languages speak and gesture differently when narrating the same motion events (for an overview see [3, 25]). Gullberg [25], among others, uses co-speech gestures as a tool to investigate how events are conceptualized by speakers across different languages. Depending on how information is syntactically structured in motion expressions, gestures often reflect the linguistic encoding and the linguistic conceptualization. Meaning expressed in a single clause is likely to be represented by one gesture, and the same meaning expressed in a two-clause construction is often accompanied by two separate gestures [26, 27]. Speech-gesture studies of verb-framed languages often show that speakers use a two-clause construction to express path and manner, and that this syntactic allocation is reflected in two separate gestures: one for manner and one for path. Apparently, speakers of verb-framed languages perceive manner as a separate element that can augment directed motion, whereas speakers of satellite-framed languages see manner as an inherent component of directed motion [17].

Previous findings concerning Italian co-speech gestures indicate that Italian speakers may deploy a double strategy for lexicalization - using both satellite-framed and verb-framed constructions - to a greater extent than speakers of other verb-framed languages, and that co-speech gestures reflect the choice of lexicalization [28-30]. When Italian speakers construct motion in a satellite-framed way, they gesture like speakers of satellite-framed languages. This pattern confirms findings by Kita et al. [31] indicating that the linguistic influence on gestural representations is a result of an online interaction between linguistic conceptualization and gestural representations. Co-speech gestures may therefore shed new light on the conceptualization of ambiguous event construal and on what meaning speakers attend to and select for expression in situations calling for constructions atypical of their language's preferred lexicalization pattern.

2.4. Research question

In this paper, we first ask how motion is generally encoded across boundary and non-boundary-crossing events in Italian, and whether Italian speakers show satellite-framed behavior in boundary-crossing situations as proposed in recent literature. To examine whether such possible satellite-framed constructions (manner verb + locative PPs) are in fact conceptualized as a figure's traversal of a spatial boundary, we use co-speech gestures as a reflection of linguistic conceptualization.

3. Methodology

The participants in this study were a group of 25 native Italian speakers (female 15, mean age 25.96, SD 6.45). All participants were students at the University of Roma Tre and of Roman origin. Their English proficiency was generally at an intermediate level (mean 2.73 of 5, SD 1.19) according to a self-rated L2 English test [32].

3.1. Experimental design

Data was collected using two different sets of elicitation material. Four scenes from the Tomato Man Project [33] containing non-boundary-crossing movement, and four scenes from Boundary Ball [34] showing boundary-crossing movement. The figure, a tomato as seen in Figure 1, either rolled or jumped along a path, up and down a hill, or into and out of a small house. All participants narrated the events of the scenes to a confederate listener with the instruction that a third (naïve) listener would be able to understand and re-narrate the details of the storyline based on their descriptions.

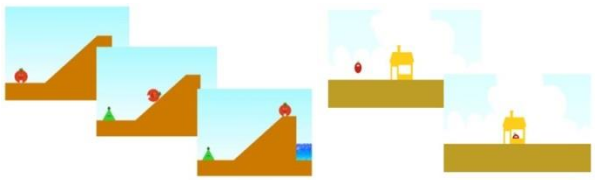

Figure 1: Elicitation material

3.2. Encoding

Speech was tokenized, and the target events labelled as to how they packaged manner and path information syntactically within a clause (8) and or in two clauses (9).

(8) The ball **[bounced down]** the hill
(9) The ball **[descended]** the hill | as it **[bounced]**

Four types (labels) of lexicalization patterns within a target event were defined as seen in Table 1.

Clause type	Example	Labels
One clause	And he **rolls up** the hill	MP
One clause	He **jumps into** the house	MP
One clause	The tomato **rolls**	MO
One clause	He **descends** the hill	PO
One clause	It **goes down** the hill	PO
Two clauses	He **descends** while **rolling**	PO+MO
Two clauses	He **enters** the house **jumping**	PO+MO

Table 1: Speech clause examples and labels

Expressions involving manner verbs + a path denoting satellites were encoded as 'one-clause' manner-path conflated constructions (MP). Constructions only containing manner or path were labelled MO and PO respectively, and expressions containing both mention of manner and path in two separate clauses were defined as a 'two-clause' PO+MO construction.

Gestures were subcategorized into three different types in terms of how information was represented in gesture (see Table 2):

Gesture type	Representation	Labels
Path	Representing only the path of motion with no explicit reference to manner	PG
Manner	Depicting only the manner of motion, that is how the figure moves, with no indication of the path	MG
Manner-path conflating	Conflating both the manner and the path of motion into one single gesture	MPG

Table 2: Gesture examples and labels

3.3. Intercoder Agreement

A second coder (a native Italian speaker) annotated 10% of the corpus and reached a Kappa agreement score of .89 for clause type and .93 for gesture type. The second coder was an experienced speech and gesture coder.

4. Results

The 25 participants produced 209 motion events (198 with gesture) and a total of 275 gestures (1.39 gestures per motion event).

4.1. Clause type results

The overall results for the two event types echo a preference for a verb-framed lexicalization pattern (77.04%), expressing path in the main verb using verbs like *salire, scendere, entrare, uscire* – 'ascend', 'descend', 'enter', 'exit' and subordinating manner, if expressed at all, in adverbial gerunds like *rotolando, saltellando* – 'rolling', 'jumping'. Dividing lexicalization patterns based on boundary-crossing (InOut) and non-boundary-crossing (UpDown) events, we observe a more varied lexicalization pattern as illustrated in Figure 2. In the bar plot, we leave out MO (manner only constructions) due to very few occurrences. Although the motion events seem similar, we observe a significant difference in how manner and path are mapped in clauses across the two motion types (X^2 50.8152, df = 3, p-value = < 0.005).

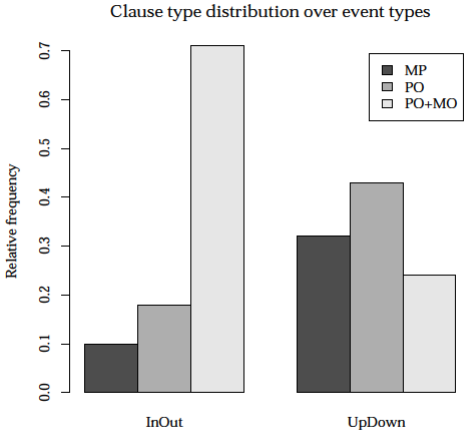

Figure 2: Clause type distribution over event types

For the non-boundary-crossing events (UpDown events), we see a mixed pattern for lexicalizing the event. Path is mainly expressed through the main verb with or without a subordinate manner verb. There is, however, a clear tendency towards expressing motion with a construction typical of satellite-framed languages (30.77%). Here manner is expressed in main verbs like *rotolare*, *saltellare* – 'to roll', 'to jump' and path with verb particles like *su*, *giù* – 'up', 'down'.

The same pattern is not observed in the boundary-crossing situations (InOut events). Manner and path are predominantly separated in two-clause constructions with path verbs and subordinate manner gerunds, e.g., *entra rotolando* – 'enters rolling'. Although Italian speakers should be limited to verb-framed constructions in the boundary-crossing events, 10.48% of the motion events are expressed in constructions typical of satellite-framed languages.

The speech data results show that Italian speakers do map manner onto main verbs and path onto verb particles or PPs, not only in non-boundary-crossing situations but also in situations where a figure crosses a spatial boundary.

4.2. Clauses types and gestures types

Turning to the gesture data, we examined how the syntactic packaging of manner and path in clauses is reflected in gestures. We observed a clear pattern of co-expressivity between semantic information across modalities. The speech-gesture distribution clearly shows that 1) one-clause constructions are expressed with one gesture and two clauses with two separate gestures, and that 2) co-speech gestures typically express the same information as the information expressed in speech.

For transparency, we visually divide the two event types (UpDown and InOut) into two separate bar charts. Manner-only constructions (MO) and manner-only gestures (MG) are not visually shown in the bar charts due to very few observations. The label 2G is given to gesture constructions in which two separate gestures are expressed within the target event, for example, one for path and one for manner.

Figure 3 shows the absolute frequency of how co-speech gesture types are distributed over clause types in the non-boundary-crossing condition (UpDown).

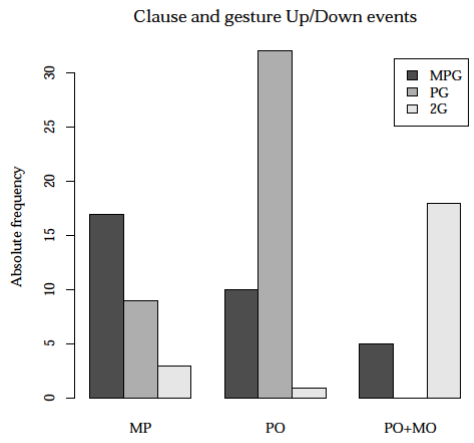

Figure 3: Absolute frequency of gesture constructions over clause type for Up/Down (non-boundary-crossing) events

The data in Figure 3 shows a relationship between clause construction and gesture expression (X^2 = 68.6372, df = 4, p-value = < 0.005). When Italian speakers express only path in speech, e.g., *entra nella casa* – 'enters the house' (PO), gestures are typically co-expressive conveying information about path only (PG). Single clause manner + path constructions (MP) are typically reflected in manner-path conflated gestures (MPG) or path gestures (PG).

However, when manner and path occur in two separate clauses, e.g., *entra nella casa rotolando* – 'enters the house rolling' (PO+MO), two separate gestures are used (2G), reflecting the conceptual division of the two semantic components. This co-expressive pattern of dividing manner and path in speech and gesture is especially evident in Figure 4, which illustrates the boundary-crossing situations (InOut). When confronted with the boundary-crossing constraint, Italian speakers prefer to express the path of motion in the main verb and subordinate manner most often in the form of an adverbial gerund. The relationship between clause type and gesture types is significant (X^2 = 69.1936, df = 4, p-value = < 0.005). Most interestingly, as observed in the speech data in Figure 2, there are a few manner verb + complex PP constructions (11 of 105 event constructions) amounting to 10.48%.

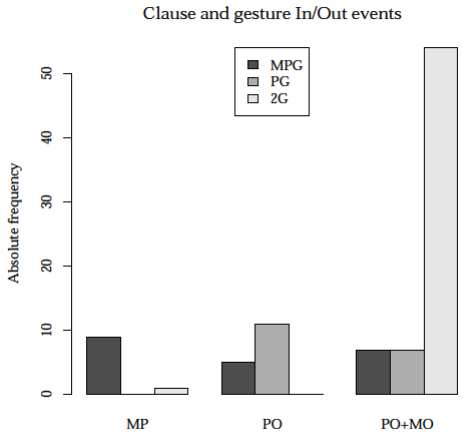

Figure 4: Absolute frequency of gesture constructions over clause type for In/Out (boundary-crossing) events

In these few cases, the tight manner verb and PP constructions (MP) are reflected in manner-path conflated gestures (MPG). Looking more qualitatively at the MP expressions and representation of gesture, we see how the manner-path conflating gestures are typically mapped across the manner verb and the locative PPs as in (10). The stroke of the gesture is indicated with brackets.

(10) Il pomodoro **rotola fuori da**lla casa
[--MPG gesture--]
'the tomato **rolls out/outside of**.the house'

Although the locative prepositions in (10) do not license directional movement, the co-speech gesture expresses both the manner of rolling and the path of the figure out of the house in one single gesture. With the co-expressivity between speech and gesture in situations where speakers construct boundary-crossing events using manner verbs and locative PPs, we argue that the event is conceptualized as a *figure's movement across a spatial boundary* and not as locative motion (no change of location). The semantic content of the gestures reinforces the argument that such constructions are valid in Italian for the manner verbs used in this study.

5. Discussion

Because speakers of verb-framed languages usually express path through the main verb, they typically resort to subordinated manner verbs to express manner of motion. Including an additional syntactic element makes the event conceptually more complex to process, which increases the tendency for speakers of verb-framed languages to leave out manner of motion [35]. This is not entirely evident in this study. Manner information is omitted more often in the descriptions of non-boundary-crossing events, but both manner and path are univocally included both in one-clause manner verb + PP constructions and in two-clause path verb + subordinate manner verb constructions across both event types.

The results paint a picture of a language that does not conform exclusively to the Talmyan typology. Speakers of modern spoken Italian widely use an option for linguistic encoding not typical of the verb-framed lexicalization taxonomy. Approximately 30% of the expressions in the non-boundary-crossing events were constructed with manner verbs and directional satellites, a systematic lexicalization pattern typical of satellite-framed languages. This event construction allows Italian speakers to easily include manner of motion in descriptions. This indicates that Italian speakers, or at least the speakers in this study, *do* focus on manner in motion descriptions and *also* resort to lighter syntactical constructions to express motion when available

The findings also support the hypothesis that speakers of Italian can use manner verb + locative PPs to express a figure's movement across a spatial boundary. This construction is not only hypothetically possible but actually produced in spontaneous speech. This option puts the boundary-crossing constraint into question, especially as a litmus test to ultimately categorize languages in the verb-framed category.

In line with many other studies, we observe co-expressivity between information expressed within the clause and the information represented in gesture. When Italian speakers construct motion atypical of their Talmyan type, gestures reflect the choice of lexicalization. This supports previous findings by Kita et al. [31] which suggest that gestural expressions are determined by the online choice of syntactic packaging of manner and path information rather than by language-specific habitual conceptual schemas. Moreover, the few instances of manner verb + PP constructions in the boundary-crossing events accompanied by manner-path conflating gestures indicate that the construction is conceptualized as being boundary-crossing and not locative motion. The combination of main manner verbs and locative PPs can be, and are, used to express boundary-crossing in Italian, although at very small frequencies.

One question remains: if manner verbs + locative PPs can express spatial crossing, why is this pattern not more widespread in Italian? According to the principles of speech economy, speakers should choose constructions which impose lighter conceptual processing. This is predominantly seen in the non-boundary-crossing situations where single clausal constructions are expressed through both manner verbs + PPs and path-only verb-constructions. But in the boundary-crossing events, we primarily see two-clause constructions. One possible answer is that only some Italian manner verbs contain an internal element of directionality – not to be confused with path verbs – which allows them to combine with locative PPs, giving rise to directional and boundary-crossing interpretation. It is debatable whether pure manner verbs have the same directional property [18]. As the manner verb + PP combination is ambiguous with one group of manner verbs and possibly not allowed for with another group of (pure) manner verbs, speakers of Italian could avoid atypical constructions by pursuing standard verb-framed lexicalization patterns. Furthermore, speakers are trained by their native linguistic experience to structure the elements of motion in a particular way typical of their language [23]. In a sense, native speakers learn to prioritize certain aspects of motion and verbalize them in a certain way.

But the fact that some Italian speakers use manner verb + complex PP constructions to break linguistic boundaries combined with co-expressive gestures reflecting the directional movement, suggests that a typical satellite-framed construction is valid for expressing boundary-crossing meaning in Italian.

These findings naturally call for further investigation into event construction but also emphasize that gesture may serve as a powerful tool to study linguistic conceptualization.

6. Conclusion

We investigated how speakers of Italian express motion events depending on the spatial properties of the elicitation material. We found that Italian speakers prefer typical verb-framed lexicalization patterns, but that the speakers in this study showed signs of an emerging satellite-framed system at least in non-boundary-crossing events, but also in situations involving boundary-crossing. We confirm the hypothesis that goal of motion expressions can be constructed with manner verb + complex locative PPs. We used co-speech gestures as a tool to investigate linguistic conceptualization of event construction, and we found that gestures may help to clarify situations with ambiguous meanings. Co-speech gestures support the claim that manner verb + locative PP constructions are conceptualized as boundary-crossing events. Overall the findings in this paper prove that speakers have a wide range of constructional possibilities at their disposal when constructing meaning in motion events, and that a particular language may use constructions pertaining both to satellite-framed and verb-framed languages. In the end, the question is not what speakers can or cannot do with language, but rather what they *do* with language.

7. Acknowledgements

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